Immersion vs. vis-à-vis

Annie Luciani

Immersion *vs.* vis-à-vis

Annie Luciani [ACROE&INPG]

The axis immersion – vis-à-vis is an efficient mean to qualify virtual reality and virtual environments systems [→ Virtual reality and virtual environment]. Further, it addresses the fundamental question of the types of relation between humans and the external world.

Immersive systems, in short, focuses on the seeing (or hearing) sense. The corresponding actions are spatial actions, such as displacements of the full body (ego-motion). This is an observational situation, implemented in the computer by metaphors such as magic carpet, fly-and-see, move-and-see, etc. These are exploratory metaphors [→ Metaphors in human-computer interaction] used in virtual environments as well as in flight or driving simulators, landscapes or cities' navigation, etc.

The questions raised by immersion are indeed similar in both the real spatial world and in virtual or abstract worlds. Both of them correspond with difficulties such as knowing where we are, keeping a spatial reference, planning the displacements in order to reach a goal. Nevertheless, some drastic discrepancies appear between immersion in virtual environments and immersion in the real world. The most important of them is that in virtual environment, the human body itself does not displace. Movements are instrumented by means of an intermediate real object (stick, wheels, balls, travelators, etc.) assisted by a virtual one (virtual arrow, virtual camera, etc). Thus, a physical transformation between the localization and displacements in real world and their effect in the virtual world is necessarily introduced. This transformation leads to the design of adapted metaphors and to the study their effects in regards with human's capabilities. One of them is the question of co-location [Jansson et al. 2004] [Messing, 2004] [→ Depth, problems of rendering]. Furthermore, the immersive situation remains conceptually problematic.

Regarding manipulation, immersion in virtual environment is a sort of teleoperation situation: human manipulates a tool in human space that has an effect in a task's space, i.e. as a kind of vis-à-vis situation. Regarding sight (what the user actually sees), it is an immersive situation in which the space is moving around the human body.

Conversely, the vis-à-vis situation is related to manipulation activities. It refers to objects that are in a local space, i.e. at the scale of the hand or body's attainable objects. Further, the vis-à-vis situation is needed to allow, ultimately, the embodiment process involved in the functional transformation of the object from the status of object to the status of instrument as a usable object to do something - the cognitive transformation of a part of the world considered an external object, into an instrument considered as a true part of the body. This final step allowed by the vis-à-vis situation is further discussed in [→ Instrumental interaction].

In the vis-à-vis situation and in the immersive situation, the relation between action and sight and/or hearing deeply differs. During the immersive activity, seeing and hearing are mainly the goal of the current action (move in order to see, move in order to hear). Conversely, in the vis-à-vis situation, seeing and/or hearing are mainly a way of controlling the current action (put here, hit, write, etc…).

This analysis shows that it is fruitful to consider the two concepts of immersion and of vis-à-vis as being not competitive, but rather as being complementariy operational. Considering their complementarity is in particular helpful in the analysis of the relations between human and the external world in order to obtain guidelines for the design of new interactive tools and instruments. Three progressive different scales can be distinguished in objects:

- *Surrounding objects:* Surrounding objects are far in spatial distance. For such objects, there

is a clear predominance of space and of the geometry of the space, and a clear predominance of seeing and hearing for spatial localisation.

- *Ready-to-hand objects:* Objects ready-to-hand are objects one can potentially manipulate. For such object, there is with a balance between space and geometry on the one hand, and between physics and materiality on the other hand.

- *In-hand objects:* Objects in-hand are objects actually manipulated. For such objects, there is a clear predominance of the materiality in the experience. At that point, there may be also a fluent and permanent trade-off between the notion of object (that remains cognitively external) and the notion of instrument (cognitively embodied, playing as a part the body).

In the daily life, the operational role of objects is permanently changing along these three states, stressed between the two extreme cases of environment/immersion and instrument/vis-à-vis. In the middle, the notion of object is somewhat fuzzy that can be considered either as a part of the environment or as a vis-à-vis. Today, the implementation of such versatility in the functions of simulated objects is still a fundamental question. For example, we are still unable to implement the continuous state changing, and the required correlated algorithms and simulation processes transformations, as when one experiences walking toward a violin or a hammer, then grasping it in hands and transforming it into an instrument to be played or to hit One of the major challenges the fields of multimodal interfaces, and especially of enactive interfaces, face today is the possibility of co-articulating in a versatile way all these three drastically different states in computer mediated relations between humans and artificial systems.

References

[Cadoz et al. 1984] Cadoz C., Luciani A., Florens J.L. « Responsive input devices and sound synthesis by simulation of instrumental mechanisms : The CORDIS system » - Computer Music Journal - N°3. 1984.

[Jansson et al. 2004] Jansson, G. & Öström, M. (2004). The effects of co-location of visual and haptic space on judgements of form. In M. Buss & M Fritschi (Eds.), Proceedings of the 4th International Conference Eurohaptics 2004 (pp. 516-519). München, Germany.

[Messing, 2004] Messing, R. (2004). Distance perception and cues to distance in virtual reality. Poster at First Symposium on Applied Perception in Graphics and Visualization, co-located with ACM SIGGRAPH, August 7-8, 2004, Loa Angeles, CA.

Related items

Depth, problems of rendering
Instrumental interaction
Metaphors in human-computer interaction
Reality, augmented and mixed
Virtual reality and virtual environment